



THE UNIVERSITY *of* EDINBURGH

## Edinburgh Research Explorer

### Depression and physical disability in chronic pain

**Citation for published version:**

Costa, J, Maroco, J, Monteiro da Rocha Bravo Ferreira, N & Pinto-Gouveia, J 2016, 'Depression and physical disability in chronic pain: The mediation role of emotional intelligence and acceptance', *Australian Journal of Psychology*. <https://doi.org/10.1111/ajpy.12131>

**Digital Object Identifier (DOI):**

[10.1111/ajpy.12131](https://doi.org/10.1111/ajpy.12131)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Peer reviewed version

**Published In:**

Australian Journal of Psychology

**General rights**

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

**Take down policy**

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33

Depression and Physical Disability in Chronic Pain:  
The Mediation Role of Emotional Intelligence and Acceptance

**Abstract**

**Objective:** Emotional intelligence (EI) and acceptance have previously been identified as potential factors in the adjustment to Chronic Pain. This study examined the associations between Chronic Pain (CP) experiences, depression, and physical disability. It further investigated the mediating effect of emotional intelligence (EI) and acceptance in the relationship between CP experiences, depression, and physical disability and how this changes with the duration of the CP. **Method:** A cross-sectional design, employing validated questionnaires was used to measure pain experience, physical disability, depression, EI and acceptance in 133 CP patients. **Results:** All variables were found to be significantly associated in theoretically predicted ways. The relationship between CP experiences and depression was mediated by both factors, as high EI and acceptance promoted a decreased influence of pain on depression. By contrast, the relationship between CP experiences and physical disability was mediated by acceptance, but not by EI. Further, the temporal stability analysis of this mediation model showed that long-term CP patients are better able to make use of these factors. **Conclusions:** the relationship between the experience of pain and depression or physical disability seems to be significantly mediated by factors such as EI and acceptance. This study lends further support to the development of more encompassing models, that take both control and non-control variables into account when conceptualizing the adjustment to CP. Theoretical and clinical implications are discussed.

*Keywords:* Chronic pain experiences, physical disability, emotional intelligence, acceptance, depression.

1       What is already known about this topic:

- 2       - Emotional Intelligence influences mental and physical outcomes.
- 3       - Acceptance is a key-process in behavior change.

4       What this topic adds:

- 5       - Acceptance and Emotional Intelligence decrease depression levels while acceptance
- 6       has more influence on decrease physical disability.
- 7       - The influence of Emotional Intelligence and acceptance on outcomes varies across
- 8       disease progression.
- 9       - Long-term Chronic Pain patients are better able to used emotional and cognitive
- 10      control when this is needed, but cease it when unchangeable pain is present

## INTRODUCTION

Chronic pain (CP) is a distressing experience characterized by unpleasant sensory and emotional features not only determined by the intensity of the nociceptive stimulation, but by psychological factors as well (Turk, Swanson & Tunks, 2008). The association between CP and depression has been consistently reported in the literature, with prevalence studies finding between 18 to 56 percent of comorbidity between these conditions (Bair, Robinson, Katon, Kroenke, 2003). There is an emerging consensus that individuals with more severe, frequent, and enduring pain are at greater risk of developing depression (Campbell, Clauw, Keefe, 2003). Several studies have also demonstrated that depressed CP patients exhibit higher levels of physical disability (Arnow, Hunkeler, Blasey, Lee, Constantino, Fireman, Kraemer & Hayward, 2006; Emptage, Sturm & Robinson, 2005; Ericsson, Poston, Linder, Taylor, Haddock & Foreyt, 2002). However, research that sheds light on the possible contribution of buffering factors in the relationship between these variables is still in its early stages.

Emotional intelligence (EI) is defined as “the ability to perceive, appraise and express emotion; to understand emotion and emotional knowledge; to regulate emotions to promote emotional and intellectual growth” (Mayer & Salovey, 1997, p.10). Individuals with an adequate processing of affective information would be able to manage the negative affect generated by pain, hence reducing the perceived intensity of pain. Two recent meta-analyses support the association between higher levels of EI and better mental and physical health outcomes (Schutte, Malouffa, Thorsteinsson, Bhullar & Rooke, 2007; Martins, Ramalho & Morin, 2010). Thus, people with higher EI are better skilled to cope with everyday demands (Bar-On, 1997; Taylor, 2001). In CP, higher EI is linked with better psychosocial functioning, which may have a buffer effect on physical disability (Brown & Schutte, 2006; Salovey & Grewal, 2005). Extremera and Fernández-Berrocal (2002) have also found higher levels of EI to be associated with lower levels of bodily pain and higher physical functioning.

1        Recently, acceptance has been put forward as a key mediator between experiences of  
2 chronic pain and multiple outcomes, such as depression and physical disability (Gillanders,  
3 Ferreira, Bose & Esrich, 2013; McCracken & Eccleston, 2005; Wicksell, Olsson & Hayes,  
4 2010). Acceptance can be defined as: ” a willingness to experience continuing pain without  
5 needing to reduce, avoid, or otherwise change it” (McCracken, 1999). Acceptance creates a  
6 fundamentally different choice for the management of CP by moving individuals away from  
7 struggling to control, toward living the kind of life they want to live and accomplishing valued  
8 goals (McCracken, 1995).

9        Both EI and acceptance can be conceptualized as factors that influence mental and  
10 physical health in CP, however, the issue of control over cognition and emotion has been  
11 argued to be the key difference between these two constructs (Bond & Bunce, 2003;  
12 Donaldson-Feilder & Bond, 2004; Hayes, Wilson, Gifford, Follette, Strosahl, 1996; Wells &  
13 Carter, 2001). Whilst acceptance focuses on ceasing control in the service of valued behaviour,  
14 EI would focus on changing and improving emotional processing in the service of symptom  
15 reduction. Recent research has shown that control and non-control focused approaches to CP,  
16 rather than being mutually exclusive, actually provide a more encompassing model of  
17 adjustment to CP (Gillanders et al., 2013; Sullivan, 2012; Vowles, McCracken & Eccleston,  
18 2008). Few studies have looked at the importance of both cognitive-content and contextual-  
19 behavioral factors as possible mediators between the experience of pain and outcomes such as  
20 disability or depression (Gillanders et al., 2013).

21        This study examined the association between CP experiences, depression, and physical  
22 disability. Several studies have already shown the strong mediating role of acceptance in this  
23 relationship (Galli, Ettli, Palla, Ehlert & Gaab, 2010; McCracken & Eccleston, 2005;  
24 Sullivan, Adams, Rhodenizer & Stanish, 2006). However, we also investigate the possible  
25 efficacy of models that combine both cognitive- content (e.g., EI) and contextual-behavioral

factors (e.g., acceptance) as multiple competing mediators. Adjustment to CP is likely to change over time with some strategies being more or less effective at different points since CP inception (Newman, Fitzpatrick, Revenson, Skevington & Williams, 1996). Therefore, we also investigated the equivalence of this mediation model in two samples of recently and long-term CP diagnosed individuals.

## **METHODS**

### **Participants**

Out of 141 patients invited, 134 initially consented to participate (response rate = 95.0 %). One was excluded due to the presence of a psychotic disorder. Of a total of 133 participants, 55 individuals had a recent CP condition (<2years; 44 female,  $M_{age} = 55.93$ ,  $SD = 17.84$ ; 11 male,  $M_{age} = 52.82$ ,  $SD = 18.86$ ) and 78 individuals had a long-time CP condition (>2years; 69 female,  $M_{age} = 55.12$ ,  $SD = 13.52$ ; 9 male,  $M_{age} = 56.11$ ,  $SD = 14.36$ ).

Demographic information of both groups is presented in Table 1.

-----  
Insert Table 1 approximately here  
-----

### **Procedure**

In a cross-sectional design, attendees at three National Health Services and a Specialized Service were recruited. They were given questionnaire packages that contained information sheets, consent forms, and a series of validated self-report questionnaires designed to measure pain, physical disability, emotional intelligence, acceptance, and depression. Ethical approval for the study was obtained from the Ethics Committee of both ACES-Oeste Sul and Instituto Português de Reumatologia.

Patients were eligible to participate if they were aged 18 years or over and had a primary diagnosis of Chronic Pain, according to the International Association for the Study of Pain (Merskey & Bogduk, 1994) (e.g. pain that persists for an extended period of time with a

minimum duration of 6 months, that accompanies a disease process, or that is associated with a bodily injury that has not resolved over time). Patients were excluded due to the presence of a malign or terminal condition, psychotic disorder, personality disorder, substance misuse problems, and those with intellectual impairment (e.g., learning disability, Alzheimer's dementia). Patients were also excluded if they were currently involved in a psychological treatment intervention. These criteria were assessed by pain clinic consultants involved in the study.

## Measures

### *Demographic variables*

Demographic variables (gender, age, marital status, profession, years of education and duration of pain) were assessed with a general checklist designed for this study.

### **Chronic Pain Experiences**

*McGill Pain Questionnaire- Short Form* (MPQ-SF: Melzack, 1987; Portuguese version by Melzack, 2005) is a 15-item adjective checklist rated on a 4-point intensity scale (from 0= None to 3= Severe) (i.e. sensory and affective dimensions) as well as two single-item measures (i.e. visual analogue numerical scale and pain intensity). The MPQ has both a total score and partial scores, where high scores mean higher levels of pain. For the purposes of this study, only the adjective checklist was used. The internal consistency estimates for both sensory and affective dimensions were .78 and .76, respectively (Melzack, 1987). In the present study the internal consistency, Cronbach's Alpha was .814.

### **Physical Disability**

*The Arthritis Impact Measurement Scale 2* (AIMS2: Brandão, Zerbini & Ferraz, 1995; Portuguese version by Costa & Pinto-Gouveia, 2005) is a 78-item self-report scale that assesses health status in a multidimensional fashion using specific scales. The AIMS scales are scored in an inverse way, where low scores indicate better health status. The 9 original



1 AIMS scales could be combined into 3 or 5 component models of health status. For the  
2 purpose of this study, only the physical function scale was used (Cronbach's Alpha= .839).

### 3 **Emotional Intelligence**

4 *The Trait Meta-Mood Scale* (TMMS; Salovey, Mayer, Goldman, Turvey & Palfai, 1995,  
5 Portuguese version by Pinto-Gouveia & Dinis, 2006) is a 30-item self-report questionnaire  
6 that measures the "perceived emotional intelligence" on a 5-point Likert scale Items are rated  
7 from 1 (Strongly disagree) to 5 (Strongly agree). The TMMS is a (Salovey et al., 1995  
8 p.147). In other words, it measures the beliefs individuals have about their emotional abilities  
9 through three main domains of intrapersonal emotional intelligence: the 13-item Attention  
10 subscale assesses individual's beliefs about their ability to take notice and think about their  
11 own emotional states and moods (e.g. "*I pay a lot of attention to how feel*"); the 11-item  
12 Clarity subscale asks participants to evaluate their ability to understand and discriminate  
13 among moods and feelings (e.g. "*Sometimes I can't tell what my feelings are*"); and the 6-  
14 item Repair subscale that targets their perceived emotion regulation skills on maintaining  
15 positive emotions and repairing negative moods ("*Although I am sometimes sad, I have a*  
16 *mostly optimistic outlook*"). In the current study, a total score comprised of all items was used  
17 (Cronbach's Alpha= .808).

### 18 **Acceptance**

19 *The Acceptance and Action Questionnaire-II* (AAQ-II; Bond, Hayes, Baer, Carpenter,  
20 Orcutt, Waltz & Zettle, 2011; Portuguese version by Pinto-Gouveia, Gregório, Dinis &  
21 Xavier, 2012) is a 7-item self-report questionnaire that assesses experiential avoidance, as  
22 efforts to not come into contact with unpleasant private events such as thoughts, feelings,  
23 emotions, and sensations, by trying to change their occurrence, form, or frequency especially  
24 when doing so leads to undesirable outcomes. Items are rated on a 1 (Never true) to 7  
25 (Always true) rating scale; higher results mean higher acceptance. AAQ-II has a mean alpha

coefficient of .84 (from .78 to .88) and the three and 12 months test-retest reliability were .81 and .79, respectively. The AAQ-II scores concurrently, longitudinally, and incrementally predict several outcomes, from mental health to work absence rates. The AAQ-II also shows appropriate discriminant validity and appears to measure the same concept of AAQ-I with better psychometric properties (Bond et al., 2011). In the present study the internal consistency, Cronbach's Alpha was .893.

### **Depression**

*The Depression, Anxiety and Stress Scales* (DASS-42; Lovibond & Lovibond, 1995; Portuguese version by Pais-Ribeiro, Honrado & Leal, 2004) consists of three subscales aimed at assessing levels of depression (e.g., "*I couldn't seem to experience any positive feelings at all*"), anxiety (e.g., "*I was aware of dryness of my mouth*"), and stress (e.g., "*I found it difficult to relax*"). Each item is rated on a 4-point rating scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much, or most of the time"). In the original version all subscales presented an adequate to good internal consistency with alpha's values of .81 for depression, .73 for anxiety, and .81 for stress subscales. Similar values were found by Pais-Ribeiro et al. (2004), with the Portuguese version of the scale presenting internal consistency coefficients of .93 (depression), .83 (anxiety) and .88 (stress). In the current study only the depression scale was used (Cronbach's Alpha= .961).

### **Data analysis plan**

A priori power calculation was based on the empirical simulations presented in Fritz and MacKinnon (2007). This procedure allows us to test the power for six different tests of mediation, including the Bias-corrected bootstrap test used in our study.

Kolmogorov-Smirnov test and absolute values of Skewness and Kurtosis were used to assess data normality.

Descriptive, preliminary, and correlational analyses were performed using SPSS Statistics (V. 22; SPSS, An IBM Company, Chicago, IL). Independent Student's *t* tests were performed to compare the two samples on age and education. Pearson's  $\chi^2$  test was used to compare the two samples on sex, marital status, and profession. Product-moment Pearson correlation analyses were performed to examine the associations between pain, physical disability, depression, emotional intelligence, and acceptance.

The analysis of emotional intelligence and acceptance as mediators in the relationship between pain experiences, physical disability, and depression was performed using a Structural Equation Modelling approach with AMOS (V. 22; SPSS, An IBM Company, Chicago, IL). Together EI and acceptance were expected to reduce the effect of pain experience on depression and physical disability. The presence of multivariate outliers was assessed with the squared Mahalanobis Distance ( $DM^2$ ). Pain was assumed to be the independent variable as measured by MPQ, physical disability and depression were assumed to be the dependent variables as measured by AIMS2 and DASS-42 respectively, and both emotional intelligence and acceptance were assumed to be mediators as measured by TMMS and AAQ-II, respectively. The model tested was not based on a particular theory and the variables involved in the mediation are included in theoretically distinct models (e.g., traditional Cognitive-Behavioural Therapy and contextual-behavioural therapies specifically Acceptance and Commitment Therapy). Even so, the model tested derives from previous research that has looked at the relationships between the variables separately and supports a more encompassing and non-exclusive model of CP (e.g., Gillanders et al, 2013). Based on these previous studies, a causal model of pain experiences on both the levels of depression and physical disability, mediated by emotional intelligence and acceptance was tested (Figure 1). The model fit was evaluated using several descriptive fit indices:  $\chi^2$ , comparative fit indices (CFI), root mean square error of approximation (RMSEA) and its *p*-value for  $H_0$ :

1 RMSEA  $\leq$  0.05, Tucker-Lewis Index (TLI), Aike information criterion (AIC), Browne-  
2 Cudeck criterion (BCC) and expected cross-validation index (ECVI). The following cut-off  
3 criteria were considered: (1) CFI and TLI values equal to 0.90 or greater; (2) RMSEA values  
4 of 0.06 or below (Hu & Bentler, 1999; Kline, 1998). The indirect effects were analysed with  
5 Bootstrap resampling as described in Marôco (2014).

6 Multigroup Invariance Analysis was performed to show the equivalence of the proposed  
7 mediation model across recent CP diagnosis and long-term CP diagnosis samples.

8 Further information about this type of analysis can be found in Milfont and Fisher (2011).

9 The configural invariance model tests whether the basic factor structure is equivalent  
10 across the three samples (full, recent diagnosed, long-term diagnosed). Because the  
11 satisfactory fit of the configural invariance model was shown, we proceeded to test the  
12 measurement invariance model. Measurement invariance refers to a) metric invariance-equal  
13 factor loadings across groups, b) scalar invariance- equal factor loadings and equal item  
14 intercepts across groups and, c) invariance of item uniqueness-equal factor, intercepts, and  
15 item error variances/covariances across groups. After configural invariance across groups  
16 was established, metric invariance was performed using  $\Delta\chi^2$  and  $\Delta CFI$  tests for nested models  
17 (Byrne, 2006; Dimitrov, 2010; Marôco, 2014).

## 18 **RESULTS**

### 19 **Preliminary Analysis**

20 Based on previous research, the authors would expect medium effect sizes for all the  
21 indirect paths involved in the mediation model. According to the empirical estimates, the  
22 sample size need for a power of 0.8 would be of 71 (Fritz & MacKinnon, 2014).

23 Based on the Kolmogorov-Smirnov test, some variables showed statistically significant  
24 deviation from the normal curve. However, a close inspection of the Skewness and Kurtosis

showed that this deviation was not problematic for further inferential analysis (i.e. all within  $]-0.5; 0.5[$  interval) (Tabachnik & Fidell, 2007).

The between-groups comparison tests showed that the two groups did not differ on sex ( $p = .199$ ), age ( $p = .986$ ), and years of school attendance ( $p = .163$ ).

## **Correlational analyses**

### ***Pain, Physical Disability, and Depression***

Results showed a moderate and positive correlation between pain and depression ( $r = .471$ ;  $p \leq .001$ ) with high levels of pain associated with high levels of depression. Results also showed a high and positive correlation between physical disability and depression ( $r = .592$ ;  $p \leq .001$ ) with high levels of physical disability associated with high levels of depression.

### ***Pain, Emotional Intelligence, and Acceptance***

Results showed a low and negative correlation between pain and emotional intelligence ( $r = -.191$ ;  $p < .05$ ) and a moderate and also negative correlation between pain and acceptance ( $r = -.324$ ;  $p \leq .001$ ).

### ***Emotional Intelligence, Acceptance, and Depression***

Results showed that emotional intelligence and depression had a strong and negative correlation ( $r = -.598$ ;  $p \leq .001$ ). Results also showed a high and negative correlation between depression and acceptance ( $r = -.663$ ;  $p \leq .001$ ), with low levels of acceptance associated with higher levels of depression.

### ***Emotional Intelligence, Acceptance, and Physical Disability***

Results showed a moderate and negative correlation between acceptance and physical disability ( $r = -.350$ ;  $p \leq .001$ ) with low levels of acceptance associated with higher levels of physical disability.

## **Mediation analysis**

***The influence of Pain, Emotional Intelligence, and Acceptance on Physical Disability and Depression***

The mediation model of emotional intelligence and acceptance on physical disability and depression, adjusted to 133 individuals of both genders, is depicted in Figure 2. Based on p-values the path coefficient from emotional intelligence to physical disability was excluded ( $B = .10$ ;  $S.E. = .011$ ;  $P = .378$ ;  $\beta = -.071$ ). The model showed a good fit to the variance-covariance structure ( $\chi^2(1) = .776$ ,  $p = .378$ ;  $\chi^2/df = .776$ ;  $CFI = 1.000$ ;  $TLI = 1.009$ ;  $PCFI = .100$ ;  $RMSEA = .000$ ,  $P[rmsea \leq .05] = .454$ ). All predictors, as theorized by the model, explained 60% of depression variability and 38% of physical disability variability. Pain had a direct effect on depression ( $\beta = .278$ ). Pain also had two mediated effects, one through emotional intelligence ( $\beta_{\text{Depression.Emotional Intelligence}} \times \beta_{\text{Emotional Intelligence.Pain}} = -.191 \times -.353 = .067$ ;  $p = .001$ ; 95% C.I.] .091; .298[), and the other through acceptance ( $\beta_{\text{Depression.Acceptance}} \times \beta_{\text{Acceptance.Pain}} = -.381 \times -.324 = .123$ ;  $p = .009$ ; 95% C.I.] .016; .298[) on depression. Results also showed that pain had a direct effect on physical disability ( $\beta = .535$ ). Thus, high levels of pain were associated with high levels of physical disability. Results also indicated that pain had a mediated effect through acceptance ( $\beta_{\text{PhysicalDisability.Acceptance}} \times \beta_{\text{Acceptance.Pain}} = -.324 \times -.177 = .057$ ;  $p = .009$ ; 95% C.I.] .016; .129[) on physical disability. This showed that physical disability increased by about .057 standard deviations for every increase in pain of a full standard deviation via its prior effect on acceptance. Overall, the model suggests that both emotional intelligence and acceptance are partial mediators of the relation between pain and depression, but only acceptance mediates of the relation between pain, and physical disability.

-----  
Insert Table 2 approximately here  
-----

**Multigroup Invariance Analysis the mediation model between recently CP  
diagnosed individuals and long-term CP diagnosed individuals**

The equivalence of the mediation model across two samples with different pain durations was tested with multigroup analysis. The invariance testing used the total sample and analysed the configural, measurement, and structural invariance.

Results for configural invariance indicated that the fit of the model was satisfactory ( $\chi^2/df = 1.031$ ; CFI = 1.000; PCFI = .100; TLI = .998; RMSEA = .015,  $P [RMSEA \leq .05] = .470$ ), indicating that the people with a long or short term diagnosis conceptualize the constructs in the same way. Nested model comparisons were tested with each step imposing a more restrictive level of invariance across the samples (Table 3) (as suggested by Milfont & Fischer, 2011).

For metric invariance testing, a significant  $\chi^2$  statistic difference ( $\Delta\chi^2(7) = 19.164$ ;  $p = .008$ ) and a  $\Delta CFI = -.022$  was found, therefore equal factor loadings across the samples with different pain durations were not assumed. These results indicate that the people with a long or short-term diagnosis respond to items in different ways; that is, the strengths of the relationships between specific scale items and their respective underlying construct are not the same across these two groups. Overall, these results indicated that the proposed model is operating in different ways and the underlying constructs do not have the same factorial and metric structure among long and recent CP diagnosed individuals.

The constricted model with fixed factor loadings in individuals with longer pain duration versus individuals with shorter pain duration showed significant differences from the model with free parameters. Further, model comparison was performed to test the equivalence of parameters two-by-two with critical ratios. Results show that the factor loadings differ significantly between the two samples (all  $Z$  values higher than  $Z_{0.975} = 1.96$ ) (Figures 3a and 3b). As such, the influence of both EI and acceptance on depression

and physical disability varied across different pain durations. Results showed that patients with a longer pain duration are better able to use both emotional and cognitive control when this is needed, but also to cease it in contexts where unchangeable aspects of CP experiences are present.

-----  
Insert Figures 3a and 3b approximately here  
-----

## DISCUSSION

The first step of this study confirmed that CP experiences, physical disability, depression, EI, and acceptance were related in theoretically predictable ways. As in previous research, our results showed that higher severity of pain was associated with more physical disability and more depression (Arnold et al., 2006; Bair et al., 2003; Campbell et al., 2003; Emptage et al., 2005; Ericson et al., 2002; Turk et al., 2008). Our results also confirmed a low moderate and negative association between EI and depression. These findings are consistent with previous research that has shown an association between higher abilities to use and regulate emotional information with better psychosocial functioning (Brown & Schutte, 2006; Salovey & Grewal, 2005). Further, our results showed a strong and negative association between acceptance and depression, and also between acceptance and physical disability, as previously demonstrated (e.g. Esteve, Ramírez-Maestro & López-Martinez, 2007; McCracken, 1998; McCracken & Eccleston, 2006).

Secondly, we investigated the possible mediating effects of EI and acceptance on the relation between CP experiences, depression, and physical disability. Our tested model showed that both EI and acceptance were significant mediators of the relation between the experience of pain and depression, accounting for 60% of the total variance in depression. Therefore, pain still has a direct effect on depression however, the use of both control and non-control coping strategies seems to buffer this relation. Even though this was the first time a study investigated all these constructs in one single model, the results are in line with



previous studies that have looked at these relationships separately (Fernández-Berrocal, Salovey, Vera, Extremera & Ramos, 2005; Salovey et al., 1995; Williams, Fernández-Berrocal, Extremera, Ramos, & Joiner, 2004). Regarding the relation between pain experiences and physical disability, only acceptance was found to be a significant mediator (38% of the variance score in physical disability accounted). Although previous research on chronic pain (Brown & Schutte, 2006; Salovey & Grewal, 2005) suggests that the effects of higher emotional intelligence on psychosocial functioning might have a buffering effect on physical disability, this was not confirmed in our model. Two hypotheses could be formed for why this is the case: 1. The effect of EI on physical disability is non-existent or negligible, or; 2. Most variance in physical disability is better represented by the mediator role of acceptance. The latter hypothesis would be unsurprising, as various studies have shown a strong mediation effect of acceptance in the relation between pain and physical disability (Galli et al., 2010; McCracken & Eccleston, 2005; Sullivan, Adams, Rhodenizer & Stanish, 2006). Some studies have investigated the relationships between several content variables, acceptance and their influences on CP outcomes, with acceptance being the best predictor (Vowles et al., 2008). Recently, Gillanders et.al. (2013) have shown that acceptance is a stronger mediator of this relationship when compared with catastrophizing (a coping strategy strongly related to cognitive control of pain; Sullivan, 2012), and propose that this might be related to the influence acceptance might have in helping people to maintain important goal directed activity (Vowles & McCracken, 2010).

Finally, we have also investigated the invariance of this mediation model by comparing two samples with different pain durations of CP. Our findings showed that the influence of both emotional intelligence and acceptance on depression and physical disability varied across different pain durations. Specifically, results showed that both strategies are more effective in long-term CP diagnosed individuals. Therefore, it seems that long-term CP

1 patients are better able to use emotional and cognitive control when this is needed, but also to  
2 cease control in contexts where unchangeable/uncontrollable aspects of pain experience are  
3 present. This is in line with Newman et.al. (1996) suggestion that adjustment to CP is likely  
4 to change over time, with some strategies being more or less effective at different points since  
5 CP inception. Further, recent research with a longitudinal design has shown that CP patients  
6 with high acceptance present smaller growth rates of depression through time than patients  
7 with low acceptance, even when pain and physical disability are increasing (Pinto-Gouveia,  
8 Costa & Marôco, 2015).

9 As a whole, our findings are consistent with a model of psychological flexibility as  
10 proposed by contextual behavioural researchers. In this model, the emphasis in adjustment  
11 lies mainly on how workable coping strategies are in maintaining valued directed living  
12 (Hayes, Strosahl & Wilson, 2012) and not on the content or shape of such strategies.  
13 Therefore, even though acceptance is seen to be a key adjustment process in CP (e.g. Esteve  
14 et al., 2007; McCracken, 1998; McCracken & Eccleston, 2006), other strategies that would be  
15 seen by this model as control-based, would not be excluded if they were successful in getting  
16 a patient closer to living in accord with their values. Our results lend support to the recent  
17 development of more encompassing models, that take both control and non-control variables  
18 into account when conceptualizing adjustment to CP (e.g., Gillanders, et al., 2013; Vowles et  
19 al., 2008; Sullivan, 2012). Even though contextual-behavioural approaches have achieved  
20 adequate support, other content-based approaches must be considered.

21 The emergence of these models updates the question of “what treatment, to whom,  
22 under which set of circumstances is most effective, and how does it come about?” (Reitman  
23 & Drabman, 1997, p. 426). The answer seems to be that all approaches have some validity  
24 and that the emphasis of each approach might be more or less adequate depending on the  
25 patient or at what stage of their illness they are. Therefore, we would posit that a careful

assessment (looking into the strengths and difficulties of the patient in several psychosocial processes) and integrative approaches (targeting multiple processes of change) would provide the best support for CP patients. Relevant to our findings, there are already some approaches that integrate CBT principles within a framework that reflects basic and transactional evidences in affective science, such as Emotion Regulation Therapy (ERT; Mennin & Fresco, 2009) or Emotion-Focused Therapy (Greenberg, 2007). Similarly, as suggested above, the clinical use of a blend of traditional components related to emotional focused therapy or emotion regulation therapy within a contextual-behavioural approach, such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl & Wilson, 2012), might be useful in promoting a decrease of physical disability and depression (Gillanders et al., 2013; McCracken & Eccleston, 2005; Vowles & McCracken, 2010). Acceptance-based approaches may lead therapists to consider more broadly the targets of the therapy and whether self-control of maladaptive thoughts and feelings are the most workable treatment paths in specific contexts. These models promote flexibility within psychological approaches to CP, allowing for challenge of pain experiences when it is workable, and willingness to engage with pain experiences without trying to control them when this is the most workable solution (e.g. McCracken & Eccleston, 2006).

Despite the insights that the present study provides some methodological limitations and strengths are worth noting. The cross-sectional design used in this study does not prove causation nor evaluate the temporal stability. However, the model tested was derived from previous findings that have looked at the relationships between the variables under study, separately. Even though the mediation model tested was not derived from a specific theoretical framework, it is a potential baseline for future longitudinal studies that can confirm these relationships. Also, the influence of possible confounding variables was not considered. As stated by MacKinnon (2008), the design of a mediation study leads to

different information about the relations involved. The ideal design would include random assignment to conditions, theoretical different mediation mechanisms, longitudinal measurement, and also good measures of mediator and outcome variables (MacKinnon, 2008). As an exploratory analysis, the primary goal of the present study was to identify mediation relations to be explored in future research. Therefore, future studies should use more sophisticated causal mediation methods, such as sensitivity analysis, for assessing the effects of unobserved confounders and temporal stability, as suggested by Lee et al. (2015).

As previously mentioned, there might also be a degree of overlap between key variables and further to that, a lack of objective measures because all were based on subjective self-report. This is a common problem within psychological research in CP, however, research with other types of evaluations has provided invaluable contributions to the field. One specific criticism could be made regarding the EI measure, the TMMS. There are some inconsistencies regarding the subscales of the TMMS when it is compared with the original version by Salovey et al. (1995) and only one study has confirmed the original factorial structure (Extremera & Fernández- Berrocal, 2005). However, in the present study a total score of EI was used based on the original 48 items TMMS, rather than the individual subscales. This study focused only on EI and acceptance. However, there are several psychological mechanisms through which pain influences physical disability and depression (e.g. illness perceptions, locus of control) that were not investigated. Despite this limitation, the significant variance explained (60%) by the model concerning depression, does indicate it to be representative.

It is important to note that generalizability is not only about the sample size, but also about the random sampling. Because we used a convenience sample with 133 CP individuals, our results could not be generalized to CP population and more research is therefore needed.

1           In addition, future research could provide a more detailed longitudinal investigation of  
2   how individual processes, such as EI or acceptance, change throughout the course of illness.  
3   Of clinical use would be studies that tackle the assessment and referral process based on  
4   process assessment, such as those answering questions like: “Are we able to refer patients to  
5   the most beneficial type of treatment based on process assessment?” or “Are we able to use  
6   process assessment to adjust particular techniques within multidisciplinary treatment models  
7   to the greater benefit of the patient?”.

8           In conclusion, this study has highlighted the potential importance and complexity of  
9   emotional control or non-control approaches to pain and its impact on outcomes such as  
10   depression and physical disability. Further, we have also shown how time and experience of  
11   CP can be central to change how CP patients use these approaches. Hopefully, this study will  
12   contribute to the wider discussion within the pain field of how to best serve our patients,  
13   making use of their existing strengths and coping styles.

**REFERENCES**

- Arnow, B., Hunkeler, E., Blasey, C., Lee, J., Constantino, M., Fireman, B., Kraemer, H. & Hayward, C. (2006). Comorbid depression, chronic pain, and disability in primary care. *Psychosomatic Medicine*, 68, 262–8. doi: 10.1097/01.psy.0000204851.15499.fc
- Bair, M., Robinson, R., Katon, W. & Kroenke, K. (2003). Depression and pain comorbidity: a literature review. *Archives of Internal Medicine*, 163, 2433–45. doi: 10.1001/archinte.163.20.2433
- Bar- On, R. (1997). *Emotional Quotient Inventory: technical manual*. Toronto, ON: Multi-Health Systems.
- Bond, F. & Bunce, D. (2003). The role of acceptance and job control in mental health, job satisfaction, and work performance. *Journal of Applied Psychology*, 88, 1057-1067. doi: 10.1037/0021-9010.88.6.1057
- Bond, F., Hayes, S., Baer, R., Carpenter, K., Orcutt, H., Waltz, T. & Zettle, R. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, 42, 676-688. doi:10.1016/j.beth.2011.03.007
- Brandão, L., Zerbini, M. & Ferraz, C. (1995). The Arthritis Impact Measurement Scales 2. Tradução e adaptação para a população brasileira [The Arthritis Impact Measurement Scales 2. Translation and adaptation for the Brazilian population]. *Unpublished manuscript* provided by the authors.
- Brown, R. & Schutte, N. (2006). Direct and indirect relationships between emotional intelligence and subjective fatigue in university students. *Journal of Psychosomatic Research*, 60, 585–593. doi: 10.1016/j.jpsychores.2006.05.001
- Byrne, B. (2006). *Structural equation modeling with EQS: Basic concepts, applications, and programming*. Mahwah, NH: Erlbaum.

- 1 Campbell, L., Clauw, D. & Keefe, F. (2003). Persistent pain and depression: A  
2 biopsychosocial perspective. *Society of Biological Psychiatry*, 54, 399-409.  
3 doi:10.1016/S0006-3223(03)00545-6
- 4 Costa, J. & Pinto-Gouveia, J. (2005). Medida do Impacto da Artrite. Versão portuguesa  
5 [Arthritis Impact Measurement Scales 2. Portuguese version] (*Unpublished manuscript*  
6 *provided by the authors*)
- 7 Dimitrov, D. (2010). Testing for factorial invariance in the context of construct validation.  
8 *Measurement and Evaluation in Counseling and Development*, 43, 121-149. doi:  
9 10.1177/0748175610373459
- 10 Donaldson-Feilder, E. & Bond, F. (2004). The relative importance of psychological and  
11 emotional intelligence to workplace well-being. *British Journal of Guidance &*  
12 *Counselling*, 32, 187-203. doi: 10.1080/08069880410001692210
- 13 Emptage, N., Sturm, R., Robinson, R. (2005). Depression and Comorbid Pain as Predictors of  
14 Disability, Employment, Insurance Status, and Health Care Costs *Psychiatric Services*,  
15 56, 468-474. doi: 10.1176/appi.ps.56.4.468
- 16 Ericsson, M., Poston, W., Linder, J., Taylor, J., Haddock, C. & Foreyt, J. (2002). Depression  
17 predicts disability in long-term chronic pain patients. *Disability & Rehabilitation*, 24,  
18 334-40. doi: 10.1080/09638280110096241
- 19 Esteve, R., Ramírez-Maestre, C. & López-Martínez, A. (2007). Adjustment to chronic pain:  
20 The role of pain acceptance, coping strategies, and pain-related cognitions. *Annals*  
21 *Behavioral Medicine*, 33, 179-188. doi:10.1007/BF02879899
- 22 Extremera, N. & Fernández-Berrocal, P. (2002). Relation of perceived emotional intelligence  
23 and health quality of life of middle-aged women. *Psychological Reports*, 91, 47-59. Doi:  
24 10.2466/PR0.91.5.47-59

- Extremera, N. & Fernández-Berrocal, P. (2005). Inteligencia emocional y diferencias individuales en el meta-conocimiento de los estados emocionales: una revisión de los estudios con el Trait Meta- Mood Scale. *Ansiedad y Estrés*, 11, 101-122.
- Fernández-Berrocal, P., Salovey, P., Vera, A., Extremera, N. & Ramos, N. (2005). Cultural influences on the relation between perceived emotional intelligence and depression. *International Review of Social Psychology*, 18, 91- 107.
- Fritz, M. & MacKinnon, D. (2007). Required Sample Size to detect the mediated effect. *Psychological Science*, 18, 233-239. doi: 10.1111/j.1467-9280.2007.01882.x
- Galli, U., Ettli, D., Palla, S., Ehler, U. & Gaab, J. (2010). Do illness perceptions predict pain-related disability and mood in chronic orofacial pain patients? A 6-month follow-up study. *European Journal of Pain*, 14, 550-558. doi: 10.1016/j.ejpain.2009.08.011
- Gillanders, D., Ferreira, N., Bose, S. & Esrich, B. (2013). The relationship between acceptance, catastrophizing and illness representations in chronic pain. *European Journal of Pain*, 17, 893-902. doi:10.1002/j.1532-2149.2012.00248.x
- Greenberg, M. (2007). Emotion in therapeutic relationship in emotion-focused therapy. In P. Gilbert & R. Leahy (Eds.), *The therapeutic relationship in the cognitive behavioral psychotherapies* (pp.43-62). New York: Routledge.
- Hayes, S., Strosahl, K. & Wilson, K. (2012). *Acceptance and Commitment Therapy. An experiential approach to behavior change*. New York: The Guilford Press.
- Hayes, S., Wilson, K., Gifford, E., Follette, V. & Strosahl, K. (1996). Experimental avoidance and behavioral disorders: a functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, 64, 152-68.
- Hu, L. & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.



- 1 Kline, R. (1998). *Principles and practice of structural equation modeling*. New York.  
2 Guilford Press.
- 3 Lee, H., Hübscher, M., Moseley, G., Kamper, S., Traeger, A., Mansell, G. & McAuley, J.  
4 (2015). How does pain lead to disability? A systematic review and meta-analysis of  
5 mediation studies in people with back and neck pain. *Pain*, 156, 988-997.  
6 doi:10.1097/j.pain.0000000000000146.
- 7 Lovibond, P. & Lovibond, H. (1995). The structure of negative emotional states: Comparison  
8 of the Depression Anxiety Stress Scales (DASS) with Beck Depression and Anxiety  
9 Inventories. *Behavioral Research and Therapy* 3, 335-343.
- 10 MacKinnon, D. (2008). *Introduction to statistical mediation analysis*. New York: Psychology  
11 Press.
- 12 Martins, A., Ramalho, N. & Morin, E. (2010). A comprehensive meta-analysis of the  
13 relationship between Emotional Intelligence and health. *Personality and Individual*  
14 *Differences*, 49, 554–564. doi:10.1016/j.paid.2010.05.029
- 15 Marôco, J. (2014). *Análise de Equações Estruturais. Fundamentos Teóricos, Software e*  
16 *Aplicações* [Structural Equations Analysis. Theoretical Foundations, Software and  
17 Applications]. 2ª Edição. Pêro Pinheiro: Report Number.
- 18 Mayer, J. & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter  
19 (Eds.), *Emotional development and emotional intelligence: Educational implications* (pp.  
20 3-31). New York: Basic Books.
- 21 McCracken, L. (1995). *Contextual Cognitive-Behavioral Therapy for Chronic Pain*. Seattle:  
22 IASP Press.
- 23 McCracken, L. (1998). Learning to live with pain: acceptance of pain predicts adjustment in  
24 persons with chronic pain. *Pain*, 74, 21-27. doi:10.1016/S0304-3959(97)00146-2

- 1 McCracken, L. (1999). Behavioral constituents of chronic pain acceptance: Results from  
2 factor analysis of the Chronic Pain Acceptance Questionnaire. *Journal of Back*  
3 *Musculoskeletal Rehabilitation*, 13, 93–100.
- 4 McCracken, L. (2011). *Mindfulness & Acceptance in Behavioral Medicine*. Oakland:  
5 Copyright.
- 6 McCracken, L. & Eccleston, C. (2005). A prospective study of acceptance of pain and patient  
7 functioning with chronic pain. *Pain*, 118, 164–169. doi:10.1016/j.pain.2005.08.015
- 8 McCracken, L. & Eccleston, C. (2006). A comparison of the relative utility of coping and  
9 acceptance-based measures in a sample of chronic pain sufferers. *European Journal of*  
10 *Pain*, 10, 23-29. doi: 10.1016/j.ejpain.2005.01.004
- 11 Mennin, D. & Fresco, D. (2009). Emotion regulation as an integrative framework for  
12 understanding and treating psychopathology. In A. Kring & D. Sloan (Eds.), *Emotion*  
13 *regulation and psychopathology: A transdiagnostic approach to etiology and treatment*  
14 (pp. 356-379). New York: Guilford Press.
- 15 Melzack, R. (1987). The short-form McGill Pain Questionnaire. *Pain*, 30, 191-7.  
16 [http://dx.doi.org/10.1016/0304-3959\(87\)91074-8](http://dx.doi.org/10.1016/0304-3959(87)91074-8)
- 17 Melzack, R. (2005). Short- Form McGill Pain Questionnaire. Unpublished manuscript.
- 18 Merskey, H. & Bogduk, N. (1994). *Classification of chronic pain* (2<sup>nd</sup> ed.). Seattle, WA: IASP  
19 Press.
- 20 Milfont, T. & Fischer, R. (2011). Testing measurement invariance across groups:  
21 Applications in cross-cultural research. *International Journal of Psychological Research*,  
22 3, 111-121.
- 23 Newman, S., Fitzpatrick, R., Revenson, R., Skevington, S. & Williams, G. (1996).  
24 *Understanding Rheumatoid Arthritis*. London: Routledge.

- 1 Pais-Ribeiro, J., Honrado, A. & Leal, I. (2004). Contribuição para o estudo da adaptação  
2 portuguesa das escalas de depressão ansiedade stress de Lovibond e Lovibond  
3 [Contribution to the study of the Portuguese adaptation of the depression anxiety stress  
4 scales Lovibond and Lovibond]. *Psychologica*, 36, 235-246.
- 5 Pinto-Gouveia, J., Costa, J. & Marôco, J. (2015). The impact of Acceptance in the growth of  
6 Pain, Physical Limitation and Depression in the first 2 years of Rheumatoid Arthritis.  
7 *Journal of Health Psychology*, 20, 102-112. doi: 10.1177/1359105313499807.
- 8 Pinto-Gouveia, J. & Dinis, A. (2006). The Meta-Mood-Trait Scales. Tradução para a  
9 população portuguesa [The Meta-Mood-Trait Scales. Translation for the Portuguese  
10 population] (*Unpublished manuscript provided by the authors*).
- 11 Pinto-Gouveia, J., Gregório, S., Dinis, A. & Xavier, A. (2012). Questionário de Aceitação e  
12 Acção-II. Tradução e adaptação para a população portuguesa [Acceptance and Action  
13 Questionnaire-II. Translated and adapted for the Portuguese population] (*Unpublished*  
14 *manuscript provided by the authors*).
- 15 Reitman, D. & Drabman, R. (1997). The value of recognizing our differences and promoting  
16 healthy competition: the cognitive behavioral debate. *Behavior Therapy*, 28, 419-429.  
17 doi:10.1016/S0005-7894(97)80090-1
- 18 Salovey, P. & Grewal, D. (2005). The science of emotional intelligence. *Current Directions*  
19 *in Psychological Science*, 14, 281-285. doi: 10.1111/j.0963-7214.2005.00381.x
- 20 Salovey, P., Mayer, J., Goldman, S., Turvey, C. & Palfai, T. (1995). Emotional attention,  
21 clarity and emotional repair: Exploring emotional intelligence using the Trait Meta-  
22 Mood Scale. In J. Pennebaker (Eds.), *Emotion, Disclosure & Health* (pp.125-151).  
23 Washington: American Psychological Association.

- 1 Schutte, N., Malouffa, J., Thorsteinsson, E., Bhullar, N. & Rooke, S. (2007). A meta-analytic  
2 investigation of the relationship between emotional intelligence and health. *Personality*  
3 *and Individual Differences*, 25, 167-177. doi:10.1016/j.paid.2006.09.003
- 4 Sullivan, M. (2012). The communal coping model of pain catastrophizing: clinical research  
5 implications. *Canadian Psychology-psychologie*, 53, 32-41. doi:10.1037/a0026726, 53,  
6 32-41.
- 7 Sullivan, M., Adams, H., Rhodenizer, T. & Stanish, W. (2006). A psychosocial risk factor-  
8 targeted intervention for the prevention of chronic pain and disability following whiplash  
9 injury. *Physical Therapy*, 86, 8-18.
- 10 Tabachnik, B. & Fidell, L. (2007). *Using Multivariate Statistics*. New York:Pearson  
11 Education Inc.
- 12 Taylor, G. (2001). Low emotional intelligence and mental health. In J. Ciarrochi, J. Forgas &  
13 J. Mayer (Eds.), *Emotional intelligence in everyday life: a scientific inquiry* (pp. 67-81),  
14 Philadelphia, PA: Psychology Press.
- 15 Turk, D., Swanson, K. & Tunks, E. (2008). Psychological approaches in the treatment of  
16 chronic pain patients – when pills, scalpels, and needles are not enough. *Canadian*  
17 *Journal of Psychiatry*, 53, 213–223.
- 18 Vowles, K. & McCracken, L. (2010). Comparing the role of psychological flexibility and  
19 traditional pain management coping strategies in chronic pain treatment outcomes.  
20 *Behavioral Research and Therapy*, 48, 141-146.
- 21 Vowles, K., McCracken, L. & Eccleston, C. (2008). Patient functioning and catastrophizing  
22 in chronic pain: the mediating effects of acceptance. *Health Psychology*, 27, 136-143.  
23 doi: 10.1037/0278-6133.27.2(Suppl.).S136

- 1 Wells, A. & Carter, K. (2001). Further tests of a cognitive model of Generalized Anxiety  
2 Disorder: Metacognitions and worry in GAD, panic disorder, social phobia, depression,  
3 and non-patients. *Behavior Therapy*, 32, 85-102. doi:10.1016/S0005-7894(01)80045-9
- 4 Wicksell, R, Olsson, G. & Hayes, S. (2010). Psychological flexibility as a mediator of  
5 improvement in acceptance and commitment therapy for patients with chronic pain  
6 following whiplash. *European Journal of Pain*, 14, 10, 1059.e1–1059.e11. doi:  
7 10.1016/j.ejpain.2010.05.001
- 8 Williams, F., Fernández-Berrocal, P., Extremera, N., Ramos, N. & Joiner, T. (2004). Mood  
9 regulation skill and the symptoms of endogenous and hopelessness depression in Spanish  
10 high school students. *Journal of Psychopathology and Behavioral Assessment*, 26, 233-  
11 240. doi:10.1023/B:JOBA.0000045339.67766.86

1 **Table 1.** Demographic characteristics of the both samples

Sample 1					Sample 2					
	Female		Male			Female		Male		
	(n=44)		(n=11)			(n=69)		(n=9)		
	$\chi^2$					$\chi^2$				
Marital State	2.711					1.572				
Single	3		1			5		1		
Married/ Union	34		9			54		8		
Divorced	1		1			1		0		
Widower	6		0			9		0		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Age	55.93	17.84	52.82	18.86	-.344	55.12	13.52	56.11	14.36	.206
Education	7.38	4.81	6.71	3.35	-.509	6.00	4.43	5.86	4.26	-.081

2  
3 *Legend:* Sample 1: Recent chronic pain diagnosis group (less than 2 years): Sample 2: Long-  
4 term chronic pain diagnosis group (more than 2 years);  
5 M= mean; SD= standard deviation; \*p< .05; \*\* p< .01; \*\*\* p< .001

**Table 2.** Standardized coefficients of the model that tests the mediation function of acceptance on the relationship between pain, emotional intelligence, and depression-Final Model.

	Estimates	S.E.	Z	P
Emotional Intelligence ← Pain	-.191	.198	-2.259	.024
Acceptance ← Pain	-.324	.105	-3.980	***
Depression ← Acceptance	-.381	.077	-5.780	***
Depression ← Emotional Intelligence	-.353	.038	-5.891	***
Depression ← Pain	.278	.086	4.811	***
Physical Limitation ← Pain	.535	.024	7.464	***
Physical Limitation ← Acceptance	-.177	.019	-2.466	.014

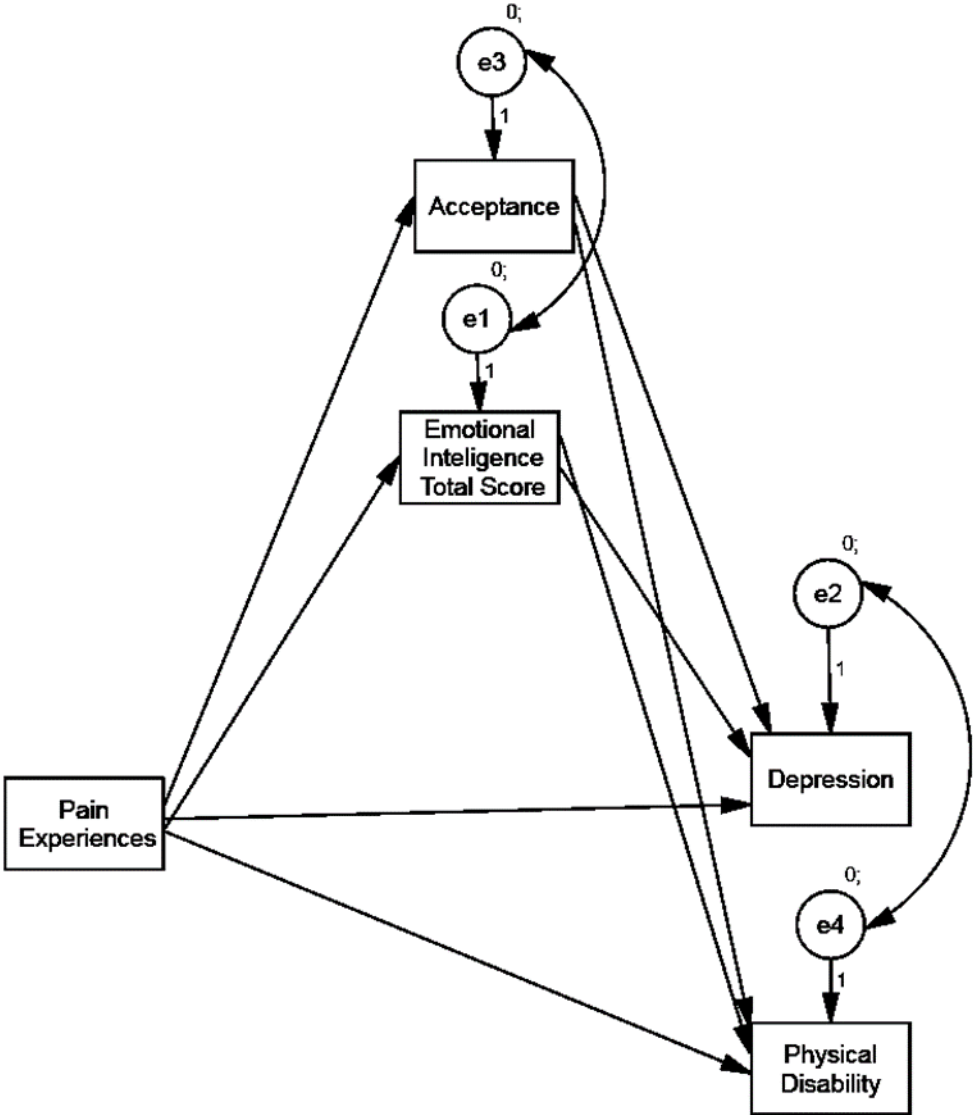
*Legend:* S.E: standardized error; Z: z score; p: p-value; \*\*\*p< .001

**Table 3.** Multigroup Invariance of the model between recent chronic pain diagnosis group and long-term chronic pain diagnosis group

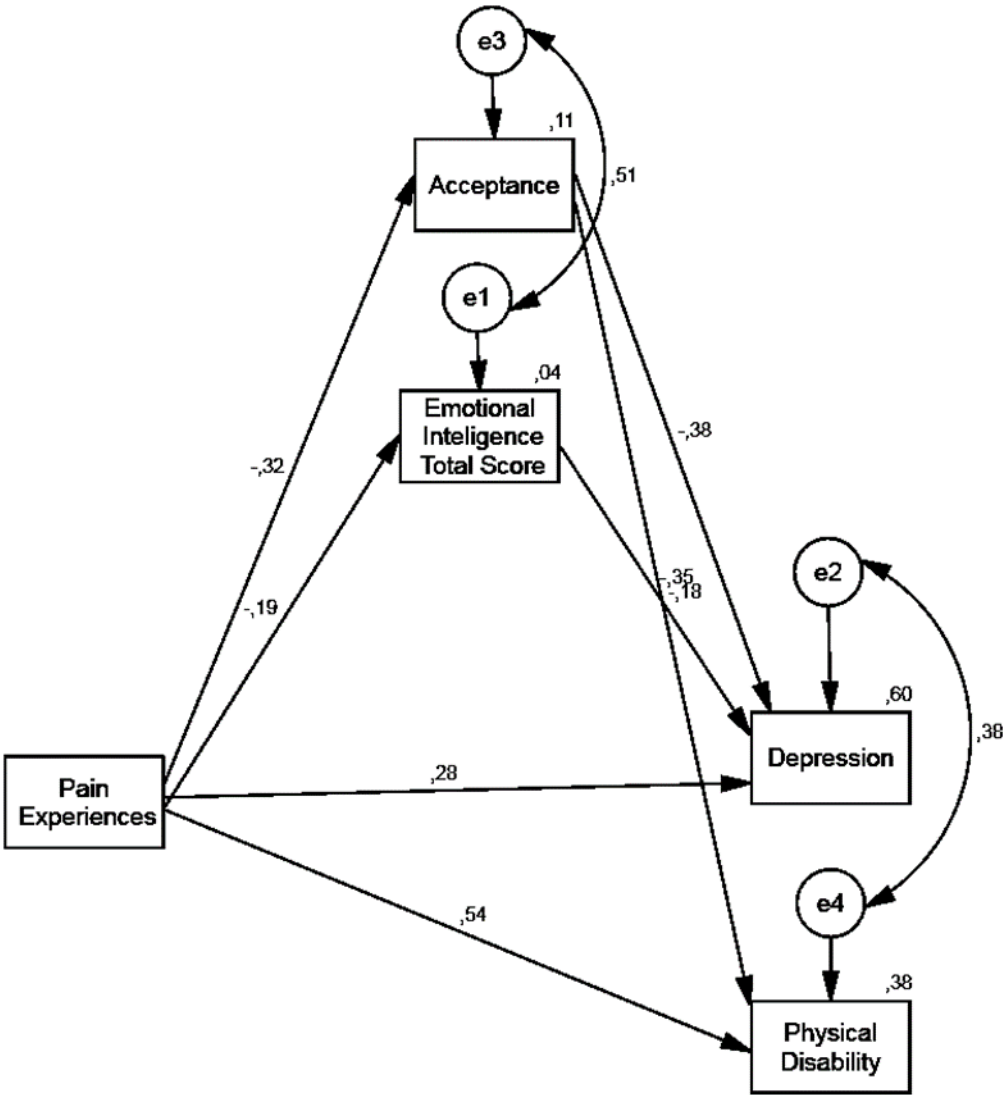
Model	$\chi^2$	df	p	dif $\chi^2$	df	p	CFI	$\Delta$ CFI	RMSEA
Configural Invariance	2.061	2	.357				.954		.015
Measurement Invariance									
Metric Invariance	21.225	9	.012	19.164	7	.008	.932	-.010	.101
Scalar Invariance	31.148	13	.003	9.923	4	.042	.924	-.034	.109
Structural Invariance	35.466	15	.002	.330	1	.566	.904	-.012	.114

*Legend:*  $\chi^2$ : Chi- squared valued; df: degrees of freedom; p: p-value; dif  $\chi^2$ : Chi-squared difference; CFI: Comparative Fit Index;  $\Delta$ CFI: a Comparative Fit Index decrease expressed in absolute value ; RMSEA: Root Mean Square Error of Approximation.

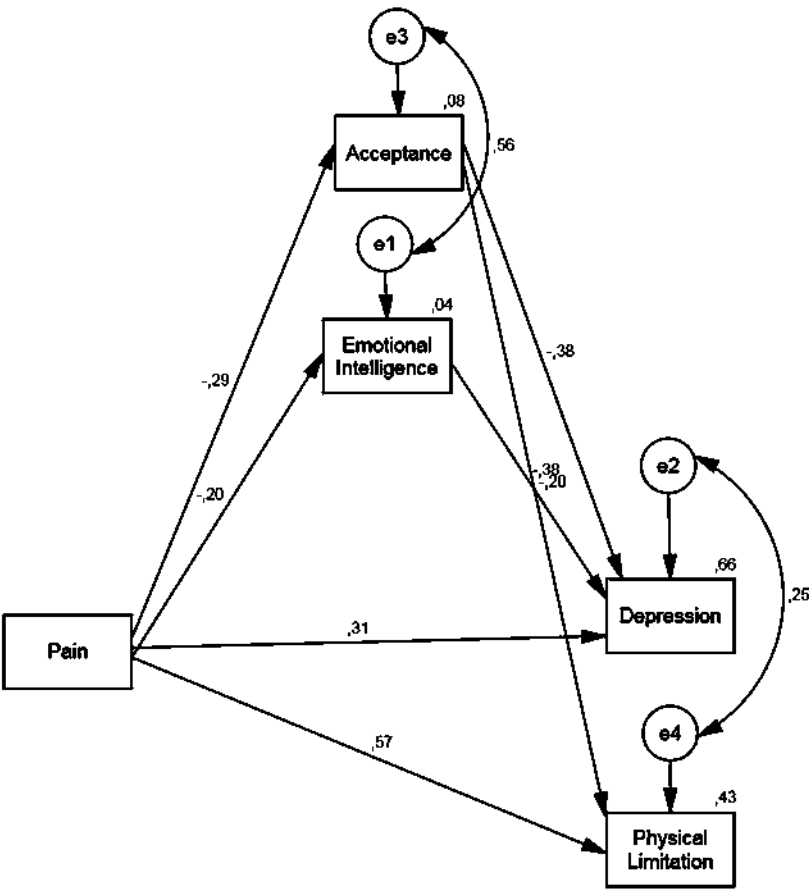




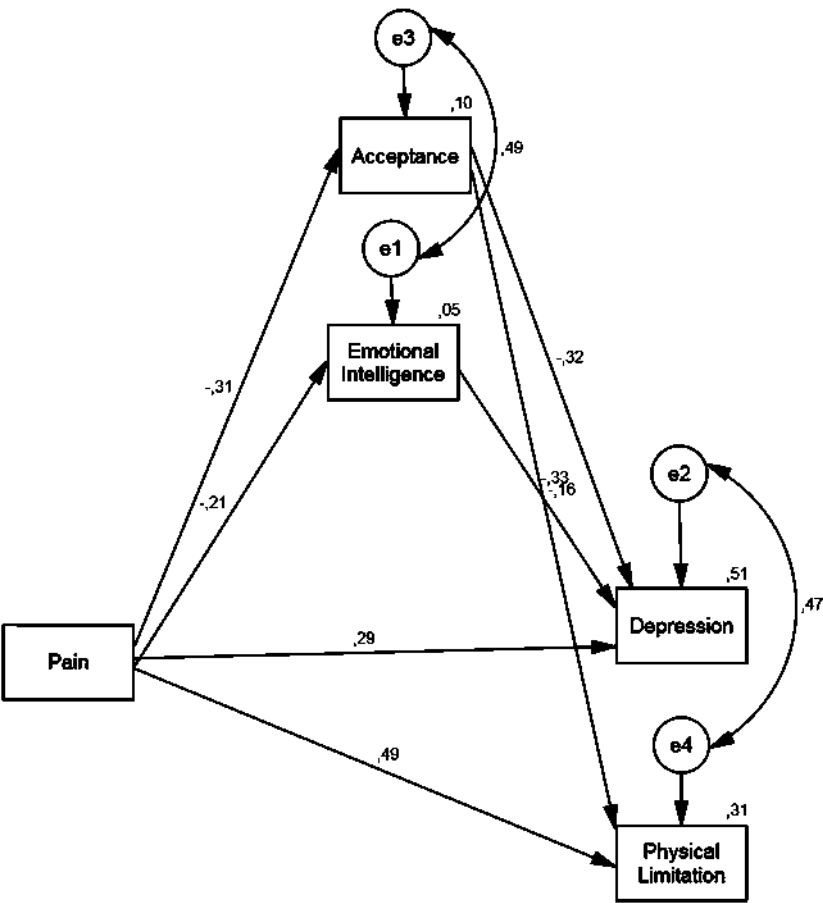
**Figure 1.**  
*Legend:* The mediation model was based on previous evidence that has looked at the relationships between the constructs under study separately and has proposed a more encompassing and non-exclusive way of looking at CP.



**Figure 2.**  
*Legend:* Final Mediation Model tested ( $\chi^2(1) = .776$ ,  $p = .378$ ;  $\chi^2/df = .776$ ; CFI = 1.000; TLI = 1.009; PCFI = .100; RMSEA = .000,  $P[\text{rmsea} \leq .05] = .454$ )



3a



3 b

**Figure 3.**  
*Legend:* Factor loadings models comparison between long-term Chronic Pain Diagnosis Group (3a) and short-term Chronic Pain Diagnosis Group (3b).